## REMARKS

There is a conflict in the current office action. The summary page (PTOL-326) indicates the action is non-final. A check of the PAIRS website also indicates the action is non-final. However, on page 6, paragraph 12, the Examiner indicates the action is final. In view of this conflict we are interpreting the action as non-final.

Claims 1, 11, 12, 14, 16, 17, 49, 50, 60, 61 and 80 were rejected under 35 USC §112, first paragraph as failing to comply with the written description requirement.

Claims 14, 17 and 60 have been restored as the Examiner properly suggests. Claim 1 has been amended to specify that the host as described in the present invention does not emit light. This feature is supported by the specification (p. 9, 88, 90, and 99) and discussed in more detail below. Further, the portion of claim 1 "with or without a linking phenylene group between the amino-group and perylene" has been deleted to make the claim clear and definite. Claim 16 has been amended as suggested by the Examiner and now is supported by the specification (p. 109). The Examiner had objected to the claims under 35 USC 112. It is now believed that this amendment makes clear the boundaries of the claim and should overcome the objection. The Examiner's attention is referred to MPEP 2703.01 which states:

> A fundamental principle contained in 35 U.S.C. 112, second paragraph is that applicants are their own lexicographers. They can define in the claims what they regard as their invention essentially in whatever terms they choose so long as the terms are not used in ways that are contrary to accepted meanings in the art. Applicant may use functional language, alternative expressions, negative limitations, or any style of expression or format of claim which makes clear the boundaries of the subject matter for which protection is sought. As noted by the court in *In re Swinehart*, 439 F.2d 210, 160 USPQ 226 (CCPA 1971), a claim may not be rejected solely because of the type of language used to define the subject matter for which patent protection is sought.

Claims 1, 11, 12, 14, 16, 17, 49, 50, 60, 61 and 80 were rejected under 35 USC §102(b) as being anticipated by or, in the alternative under 35 USC §103(a) as obvious over Aziz et al. (US 6,392,250). Claims 1, 11, 12, 14, 16, 17, 49, 50, 60, 61 and 80 were rejected under 35 USC §103(a) as being unpatentable over Aziz (US 6,392,250) in view of Fujita et al. (US 2003/0137241).

There are a number of reasons for why the present invention is not anticipated as obvious over Aziz et al. First, Aziz et al disclose a mixture of a hole transporting material, such as NPB, and an electron transporting material, such as Alq, that forms a luminescent layer host and not a mixture of Alq and perylene. The unsubstituted perylene mentioned by Aziz et al is clearly used as an emissive dopant (col. 10, lines 63-67) and is not the non-emitting perylene set forth in claim 1 of the present invention. According to claim 1, the first component perylene is a part of the host of the luminescent layer, which further includes the dopant "being selected to produce light from the light-emitting device" (element (e)). Thus, it is clear that the host does not produce light. Under typical conditions and as explained in the specification (p. 9, 88, 90, and 99), this invariably means that the host transfers its excitation energy to the emissive dopant and thus, emits no light. This is readily understood by anyone of ordinary skill in the art. Therefore, this situation is radically different from the one set up by Aziz et al, from which one skilled in the art would understand that perylene is used as an emissive dopant that is responsible for device luminescence. In case the Examiner still insists that claim 1 is not sufficiently clear as to the non-emitting property of the host, we have added "and wherein the host does not produce light" to clam 1 element (e). It is believed that this is not new matter since this statement is clearly supported by the specification (p. 9, 88, 90, and 99).

Let us consider this from another perspective. What is a host? A material is defined as a host largely by its function: if its function is to mediate charge recombination and transfer the excitation energy to the light-emitting dopant, then it can be classified as a host material, distinctly different from the dopant. A material classified as a host or a host component in a luminescent layer is, by definition, non-emitting in the presence of a dopant. Claim 1 element (e) clearly specifies that the dopant is the only species in the luminescent layer that emits light and the host is non-emitting.

Second, Aziz et al are silent as to the use of perylene, which, depending on its concentration, can form the various molecular states set forth in element (d)(i) of claim 1. Since perylene is an emissive dopant in Aziz et al, it is clear that it is not advantageous to have it aggregate because it is well known that this would drastically reduce the luminescence and change its color. However, it

is precisely this property of perylene that is advantageously made use of in the present invention, since perylene is not used as an emitter responsible for device luminescence. Aziz et al, therefore, teach away from the present invention and they set forth a different structure. In the present invention, one must carefully consider concentration-sensitive aggregation and spectroscopic properties before using the first component such as perylene. Not knowing of or appreciating the subject of the present invention, Aziz et al fail to teach how to take into account these unobvious aggregation properties in order to set up the proper conditions for the electronic excitation energy cascade within the luminescent layer and select the proper perylenes and the proper emissive dopants. Selection of proper conditions and luminescent layer components is clearly taught in the present invention. Therefore, Aziz et al is not only an irrelevant but also ineffective reference since it cannot be used to teach one skilled in the art how to practice the present invention and moreover, teaches away from it.

Third, Aziz et al disclose the use of various dopants, clearly one at a time, despite their usage of the "at least one dopant" language (col. 10, line 63). Thus, for example, they suggest to use either perylene or DCJTB – see col. 11, lines 21-22, 35-42, 48-51, and so on. Aziz et al do not teach having both perylene and DCJTB in the same device and in the same layer – nowhere in their patent do they teach a 4-component luminescent layer (2-component host and two dopants). One skilled in the art would never mix perylene dopant with DCJTB dopant in the same layer of a pure-color OLED because (1) it makes no sense since it is clear that perylene's emission will be quenched by DCJTB and (2) they understand that Aziz et al suggest using perylene as a blue-emissive dopant for a blue-emissive host, consisting of, e.g. a mixture of NPB and BAlq (blue-emitting analog of Alq), to make a blue-emissive OLED, and DCJTB as a red-emissive dopant for a green-emissive host, such as a mixture of NPB and Alq, to make a red-emissive OLED.

Fourth, the Examiner takes the position that "in alternative that Aziz et al is insufficient to anticipate a device comprising two dopants including perylene and DCJTB, it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed a device comprising Alq, perylene, and DCJTB in the same light-emitting layer according to the teachings of Aziz et al." Applicants' position is that Aziz et al is indeed insufficient. Thus, there is no basis for suggesting that one skilled in the art would have understood the present

invention "according to the teachings of Aziz et al." . According to our understanding, the Examiner appears to state that since Alq, perylene, and DCJTB are all taught as useful luminescent layer materials it is obvious to use their mixture in a luminescent layer. This is incorrect on the basis of the following.

It is an established law that an obvious to try situation cannot be used to reject a claim. This is a classical obvious to try situation. By now, there are tens of thousands of organic compounds that have been shown useful in OLEDs. One cannot simply take any three compounds found useful in an OLED and combine them in a luminescent layer and expect good performance, even less so improvements, to result from it. If this were the case, we would have had a myriad of useful mixtures around already, but we do not. Very few mixtures have been proven to be useful, and even fewer have been found to be beneficial for operating lifetime of OLEDs, probably because the exact mechanism of device degradation is still unknown. Much consideration needs to be given before putting three components together into a luminescent layer and obtaining good performance in drive voltage, electroluminescence (EL) efficiency and color, and an improvement in operating lifetime. This is indeed the subject of the present invention which Applicant believes is unobvious. The requirements for material selection are only shown in the present application and are nowhere present or suggested in the prior art.

Let us consider the reference by Aziz et al alone. Combining any three materials suggested for a luminescent layer in this reference would lead to at least several thousands of various mixtures. Would they all be useful? No, by any means they would not. Would the useful ones be obvious to one skilled in the art? Clearly, no. The knowledge of the useful ones is only now slowly emerging through the works such as the present invention.

Fifth, the perylene dopant of Aziz et al and the first component perylene of the present invention are deemed to have different functions, properties, and capabilities. As for the functions, it is in no way obvious that the material that emits light in order to improve luminescent efficiency and color in one application can be used as a non-emitting species in order to improve operating lifetime in another. The properties are different too as they are concentration-sensitive: the perylene dopant of Aziz et al requires use of low

concentrations, 1% or less, in order to be at its best EL efficiency (thus, its behavior is characteristic of perylene monomer) while in Applicant's disclosure the concentrations are relatively high to promote formation of aggregate species. The capabilities are also different, first, because the concentrations are different (which leads to emission color being different and lifetime being different – there is no lifetime extension at low concentrations but there is lifetime extension at higher concentrations), and second, no one has shown before that perylene is capable of extending operating lifetime as a first host component of the present invention. Moreover, the exact mechanism of this lifetime extension remains to be discovered. It is then quite unobvious that aggregation may be related to lifetime extension. Thus, prediction of the lifetime-extending effect was impossible until the present invention. Clearly, the present invention as exemplified by claim 1 is new and unobvious and should be allowed.

It is quite unexpected that incorporation of the first component perylene in a luminescent layer results in such large improvements in operating lifetime. Thus, the invention is not only unobvious but shows an unexpected advantage over the prior art, where such operating lifetime improvements over comparative examples combined with such long lifetimes have never been demonstrated. Neither Aziz et al nor Fujita et al taken singly or in combination disclose the subject matter of claim 1. Moreover, they do not disclose that the addition of perylene at relatively high concentrations, as to promote aggregate formation, improves lifetime.

Accordingly, it is believed there is no motivation in Aziz et al for the present invention and claim 1 is unobvious in view of Aziz et al.

Claims 1, 11, 12, 14, 16, 17, 49, 50, 60, 61, and 80 were rejected under 35 USC 103(a) as being unpatentable over Aziz et al (US 6,392,250) in view of Fujita et al (US2003/0137241).

Aziz et al has been discussed above. Fujita et al focuses on synthesis of perylenes, more specifically, mostly periflanthenes which are red emitters. They disclose the use of this material in an EL device (page 129, col. 1, example 4) which uses rubrene as a host and a periflanthene as a dopant and does not involve either Alq or DCJTB. There is nothing in Fujita et al that would suggest the use of the component in element (d)(i) of claim 1. Moreover, Fujita et al do not cover the specific perylene derivatives according to the formula of claim

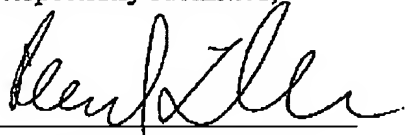
80. They, once again, focus on periflanthene and derivatives, whose aggregates are useless in the present invention as their emission wavelength is too long and they do not sensitize even red dopants. Therefore, Fujita et al is not a relevant reference for the present invention.

Since it is believed there is no motivation in Aziz et al for the present invention, a combination of Aziz et al and Fujita et al provides no motivation of the present invention either.

It is believed that these changes now make the claims clear and definite and, if there are any problems with these changes, Applicants' attorney would appreciate a telephone call.

In view of the foregoing, it is believed none of the references, taken singly or in combination, disclose the claimed invention. Accordingly, this application is believed to be in condition for allowance, the notice of which is respectfully requested.

Respectfully submitted,



Attorney for Applicant(s)
Registration No. 22,363

Raymond L. Owens/das
Rochester, NY 14650
Telephone: 585-477-4653
Facsimile: 585-477-4646

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.